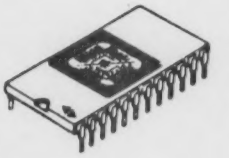
HN462732, HN462732G

4096-word × 8-bit U.V. Erasable and Programmable Read Only Memory

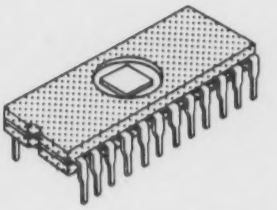
The HN462732 is a 4096 word by 8 bit erasable and electrically programmable ROM. This device is packaged in a 24-pin, dual-in-line package with transparent lid. The transparent lid allows the user to expose the chip to ultraviolet light to erase the bit pattern, whereby a new pattern can then be written into the device.

HN462732



(DC-24C)

HN462732G

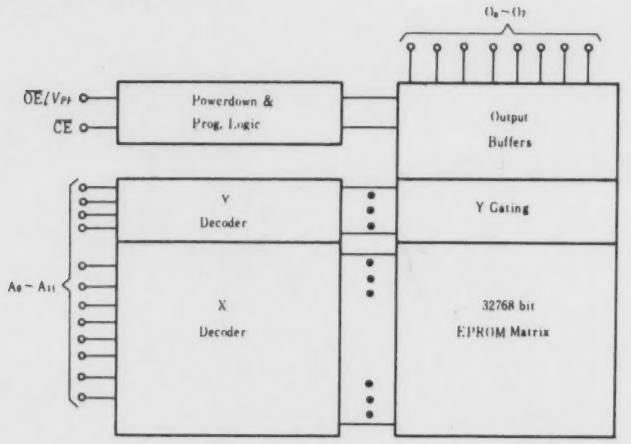


(DG-24B)

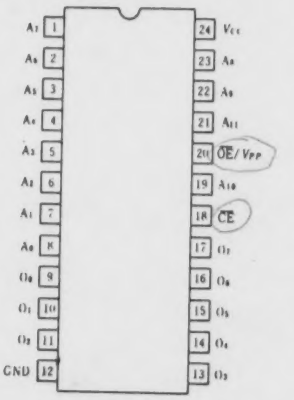
■ FEATURES

- Single Power Supply ..... +5V ±5%
- Simple Programming ..... Program Voltage: +25V D.C.
  Program with One 50ms Pulse
- Static ..... No Clocks Required
- Inputs and Outputs TTL Compatible During Both Read and Program Modes
- Fully Decoded On-Chip Address Decode
- Access Time ..... 450ns (max)
- Low Power Dissipation .... 150mA (max) Active Currents
  30mA (max) Standby Current
- Three State Output ..... OR-Tie-Capability
- Compatible with INTEL 2732

■ BLOCK DIAGRAM



■ PIN ARRANGEMENT



(Top View)

■ MODE SELECTION

Mode \ Pins	$\overline{CE}$ (18)	$\overline{OE}/V_{PP}$ (20)	V_{CC} (24)	Outputs (9~11, 13~17)
Read	V_{IL}	V_{IL}	+5	Dout
Stand by	V_{IH}	Don't Care	+5	High Z
Program	V_{IL}	V_{PP}	+5	Din
Program Verify	V_{IL}	V_{IL}	+5	Dout
Program Inhibit	V_{IH}	V_{PP}	+5	High Z

■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Value	Unit
Operating Temperature Range	T_{opr}	0 to +70	°C
Storage Temperature Range	T_{stg}	−65 to +125	°C
All Input and Output Voltage*	V_T	−0.3 to +7	V
V_{PP} Voltage*	$\overline{OE}/V_{PP}$	−0.3 to +28	V

* With respect to GND

■ READ OPERATION

● DC AND OPERATING CHARACTERISTICS (Ta=0 to +70°C, V_{CC}=5V±5%, $V_{PP}=V_{CC}$±0.6V)

Parameter	Symbol	Test Condition	min.	typ.	max.	Unit
Input Leakage Current (Except $\overline{OE}/V_{PP}$)	I_{LI1}	V_{IN}=5.25V	—	—	10	μA
$\overline{OE}/V_{PP}$ Input Leakage Current	I_{LI2}	V_{IN}=5.25V	—	—	10	μA
Output Leakage Current	I_{LO}	V_{out}=5.25V	—	—	10	μA
V_{CC} Current (Standby)	I_{CC1}	$\overline{CE}=V_{IH}$, $\overline{OE}=V_{IL}$	—	—	30	mA
V_{CC} Current (Active)	I_{CC2}	$\overline{OE}=\overline{CE}=V_{IL}$	—	—	150	mA
Input Low Voltage	V_{IL}		−0.1	—	0.8	V
Input High Voltage	V_{IH}		2.0	—	V_{CC}+1	V
Output Low Voltage	V_{OL}	I_{OL}=2.1mA	—	—	0.45	V
Output High Voltage	V_{OH}	I_{OH}=−400μA	2.4	—	—	V

● AC CHARACTERISTICS (Ta=0 to +70°C, V_{CC}=5V±5%, $V_{PP}=V_{CC}$±0.6V)

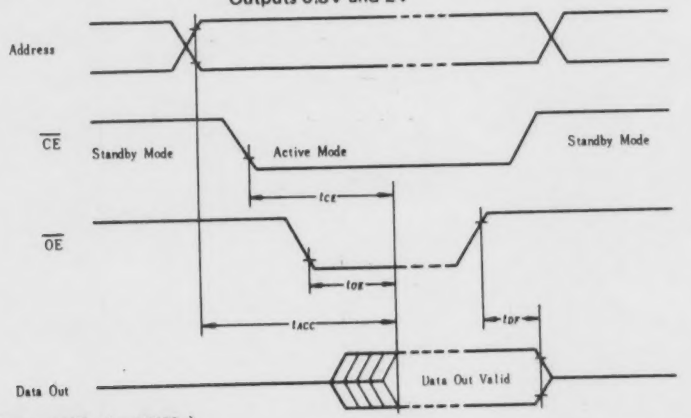
Parameter	Symbol	Test Condition	min	typ	max	Unit
Address to Output Delay	t_{ACC}	$\overline{CE}=\overline{OE}=V_{IL}$	—	—	450	ns
$\overline{CE}$ to Output Delay	t_{CE}	$\overline{OE}=V_{IL}$	—	—	450	ns
Output Enable to Output Delay	t_{OE}	$\overline{CE}=V_{IL}$	—	—	120	ns
Output Enable High to Output Float *	t_{DF}	$\overline{CE}=V_{IL}$	0	—	100	ns
Address to Output Hold	t_{OH}	$\overline{CE}=\overline{OE}=V_{IL}$	0	—	—	ns

* t_{DF} defines the time at which the output achieves the open circuit condition and is not referenced to output voltage levels.

● SWITCHING CHARACTERISTICS

Test Condition

Input Pulse Levels:	0.8V to 2.2V
Input Rise and Fall Times:	≤ 20ns
Output Load:	1TTL Gate + 100pF
Reference Level for Measuring Timing:	Inputs 1V and 2V Outputs 0.8V and 2V



● CAPACITANCE (Ta=25°C, f=1MHz)

Parameter	Symbol	Test Condition	min.	typ.	max.	Unit
Input Capacitance (Except $\overline{OE}/V_{PP}$)	C_{IN1}	V_{IN}=0V	—	—	6	pF
$\overline{OE}/V_{PP}$ Input Capacitance	C_{IN2}	V_{IN}=0V	—	—	20	pF
Output Capacitance	C_{out}	V_{out}=0V	—	—	12	pF

■ PROGRAMMING OPERATION

● DC PROGRAMMING CHARACTERISTICS (V_{CC} = 5V ± 5%, V_{PP} = 25V ± 1V, Ta = 25°C ± 5°C)

Parameter	Symbol	Test Condition	min.	typ.	max.	Unit
Input Leakage Current	I_{LI}	V_{IN} = 5.25V/0.4V	—	—	10	μA
Output Low Voltage During Verify	V_{OL}	I_{OL} = 2.1mA	—	—	0.4	V
Output High Voltage During Verify	V_{OH}	I_{OH} = −400μA	2.4	—	—	V
V_{CC} Supply Current	I_{CC}		—	—	150	mA
Input Low Level	V_{IL}		−0.1	—	0.8	V
Input High Level (All Input Except $\overline{OE}/V_{PP}$)	V_{IH}		2.0	—	V_{CC}+1	V
V_{PP} Supply Current	I_{PP}	$\overline{CE} = V_{IL}$, $\overline{OE} = V_{PP}$	—	—	30	mA

● AC PROGRAMMING CHARACTERISTICS (V_{CC} = 5V ± 5%, V_{PP} = 25V ± 1V, Ta = 25°C ± 5°C)

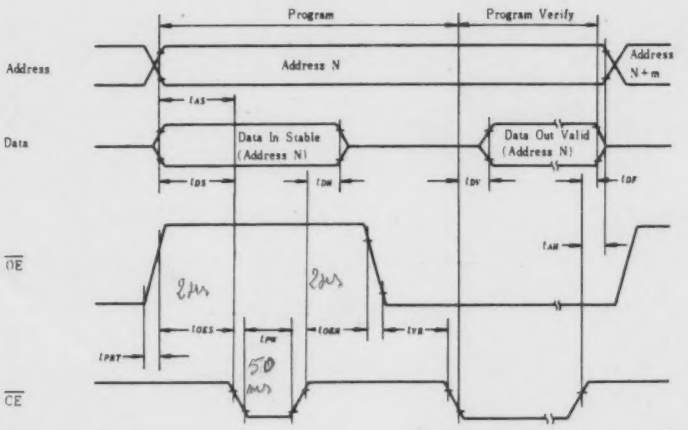
Parameter	Symbol	Test Condition	min.	typ.	max.	Unit
Address Setup Time	t_{AS}		2	—	—	μs
$\overline{OE}$ Setup Time	t_{OES}		2	—	—	μs
Data Setup Time	t_{DS}		2	—	—	μs
Address Hold Time	t_{AH}		0	—	—	μs
$\overline{OE}$ Hold Time	t_{OEH}		2	—	—	μs
Data Hold Time	t_{DH}		2	—	—	μs
Chip Enable to Output Float Delay*	t_{DF}		0	—	120	ns
Data Valid from $\overline{CE}$	t_{DV}	$\overline{CE} = V_{IL}$, $\overline{OE} = V_{IL}$	—	—	1	μs
$\overline{CE}$ Pulse Width During Programming	t_{PW}		45	50	55	ms
$\overline{OE}$ Pulse Rise Time During Programming	t_{PRT}		50	—	—	ns
V_{PP} Recovery Time	t_{VR}		2	—	—	μs

* t_{DF} defines the time at which the output achieves the open circuit condition and is not referenced to output voltage levels.

● SWITCHING CHARACTERISTICS

Test Conditions

Input Pulse Level:	0.8V to 2.2V
Input Rise and Fall Times:	≤ 20ns
Output Load:	1TTL Gate + 100pF
Reference Level for Measuring Timing:	Inputs; 1V and 2V, Outputs; 0.8V and 2V

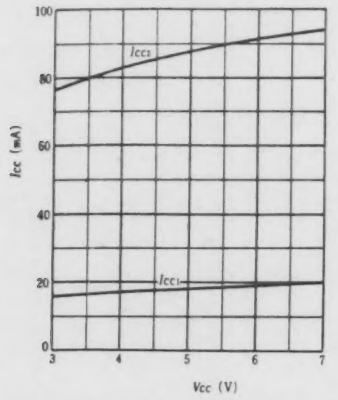


● ERASE

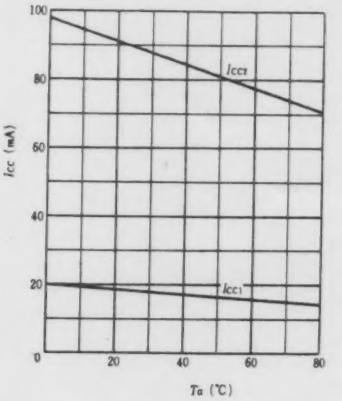
Erasure of HN462732 is performed by exposure to Ultraviolet light of 2537Å, and all the output data are changed to "1" after this prosedure.

The minimum integrated close (i.e., UV intensity x exposure time) for erasure is 15W · sec/cm².

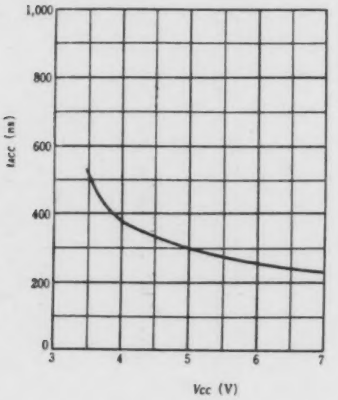
SUPPLY CURRENT vs. SUPPLY VOLTAGE



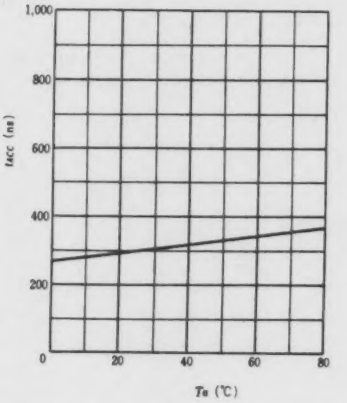
SUPPLY CURRENT vs. AMBIENT TEMPERATURE



ACCESS TIME vs. SUPPLY VOLTAGE



ACCESS TIME vs. AMBIENT TEMPERATURE

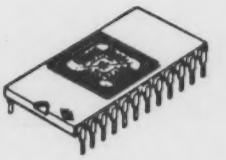


HN462532, HN462532G

4096-word × 8-bit U. V. Erasable and Programmable Read Only Memory

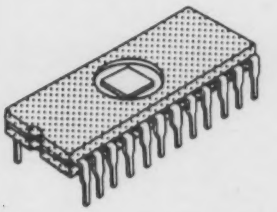
The HN462532 is a 4096 word by 8 bit erasable and electrically programmable ROM. This device is packaged in a 24-pin, dual-in-line package with transparent lid. The transparent lid allows the user to expose the chip to ultraviolet light to erase the bit pattern, whereby a new pattern can then be written into the device.

HN462532



(DC-24C)

HN462532G

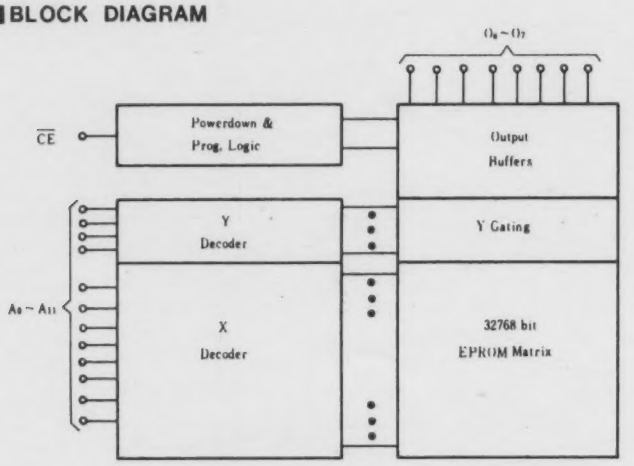


(DG-24B)

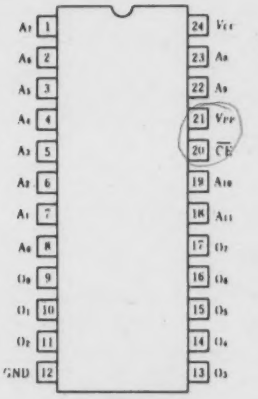
■ FEATURES

- Single Power Supply ..... +5V ±5%
- Simple Programming ..... Program Voltage: +25V D.C.
  Program with One 50ms Pulse
- Static ..... No Clocks Required
- Inputs and Outputs TTL Compatible During Both Read and Program Modes
- Fully Decoded On-Chip Address Decode
- Access Time ..... 450ns (max.)
- Low Power Dissipation .... 858mW (max) Active Power
  201mW (max) Standby Power
- Three Stste Output ..... OR-Tie Capability
- Compatible with TMS2532

■ BLOCK DIAGRAM



■ PIN ARRANGEMENT



(Top View)

■ MODE SELECTION

Mode \ Pins	$\overline{CE}$ (20)	V_{PP} (21)	V_{CC} (24)	Outputs (9 to 11, 13 to 17)
Read	V_{IL}	+5	+5	Dout
Stand by	V_{IH}	+5	+5	High Z
Program	Pulsed V_{IH} to V_{IL}	+25	+5	Din
Program Inhibit	V_{IH}	+25	+5	High Z

■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Value	Unit
All Input and Output Voltages*	V_T	−0.3 to +7	V
V_{PP} Voltage*	V_{PP}	−0.3 to +28	V
Operating Temperature Range	T_{opr}	0 to +70	°C
Storage Temperature Range	T_{stg}	−65 to +125	°C

* With respect to GND.

■ READ OPERATION

● DC AND OPERATING CHARACTERISTICS (Ta=0 to +70°C, V_{CC}=5V±5%, V_{PP}=V_{CC}±0.6V)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Input Leakage Current	I_{LI}	V_{in}=5.25V	—	—	10	μA
Output Leakage Current	I_{LO}	V_{out}=5.25V/0.4V	—	—	10	μA
V_{PP} Current	I_{PP1}	V_{PP}=5.85V	—	—	12	mA
V_{CC} Current (Standby)	I_{CC1}	$\overline{CE}$=V_{IH}	—	—	25	mA
V_{CC} Current (Active)	I_{CC2}	$\overline{CE}$=V_{IL}	—	—	150	mA
Input Low Voltage	V_{IL}		−0.1	—	0.8	V
Input High Voltage	V_{IH}		2.0	—	V_{CC}+1	V
Output Low Voltage	V_{OL}	I_{OL}=2.1mA	—	—	0.4	V
Output High Voltage	V_{OH}	I_{OH}=−400μA	2.4	—	—	V

Note : V_{CC} must be applied simultaneously or before V_{PP} and removed simultaneously or after V_{PP}.

● AC CHARACTERISTICS (Ta=0 to +70°C, V_{CC}=5V±5%, V_{PP}=V_{CC}±0.6V)

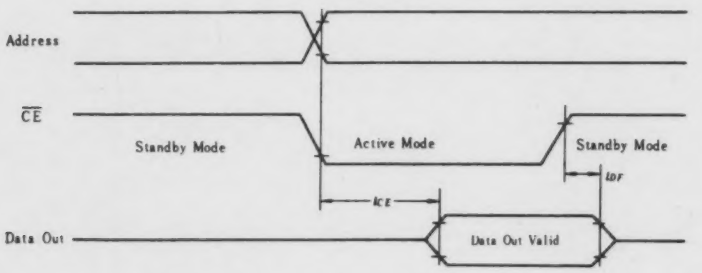
Parameter	Symbol	Test Condition	min	typ	max	Unit
Address to Output Delay	t_{ACC}	$\overline{CE}$=V_{IL}	—	—	450	ns
$\overline{CE}$ to Output Delay	t_{CE}		—	—	450	ns
$\overline{CE}$ High to Output Float*	t_{DF}		0	—	100	ns
Address to Output Hold	t_{OH}	$\overline{CE}$=V_{IL}	0	—	—	ns

* : t_{DF} defines the time at which the output achieves the open circuit condition and is not referenced to output voltage levels.

● SWITCHING CHARACTERISTICS

Test Conditions

Input Pulse Levels:	0.8V to 2.2V
Input Rise and Fall Times:	≤ 20 ns
Output Load:	1TTL Gate + 100pF
Reference Level for Measuring Timing:	Inputs; 1V and 2V, Outputs; 0.8V and 2V



● CAPACITANCE (Ta=25°C, f=1MHz)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Input Capacitance	C_{in}	V_{in}=0V	—	—	6	pF
Output Capacitance	C_{out}	V_{out}=0V	—	—	12	pF

■ PROGRAMMING OPERATION

● DC PROGRAMMING CHARACTERISTICS (Ta=25°C±5°C, V_{CC}=5V±5%, V_{PP}=25V±1V)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Input Leakage Current	I_{LI}	V_{in}=5.25V/0.4V	—	—	10	μA
V_{PP} Supply Current During Programming	I_{PP2}	$\overline{CE}=V_{IL}$	—	—	30	mA
V_{CC} Supply Current	I_{CC}		—	—	150	mA
Input Low Level	V_{IL}		−0.1	—	0.8	V
Input High Level	V_{IH}		2.0	—	V_{CC}+1	V

● AC PROGRAMMING CHARACTERISTICS (Ta=25°C±5°C, V_{CC}=5V±5%, V_{PP}=25V±1V)

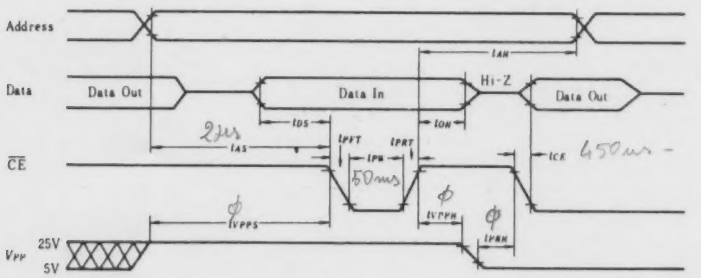
Parameter	Symbol	Test Condition	min	typ	max	Unit
Address Setup Time	t_{AS}		2	—	—	μs
Data Setup Time	t_{DS}		2	—	—	μs
Address Hold Time	t_{AH}		2	—	—	μs
Data Hold Time	t_{DH}		2	—	—	μs
Setup Time from V_{PP}	t_{VPPS}		0	—	—	ns
Program Pulse Hold Time	t_{PRH}		0	—	—	ns
V_{PP} Hold Time	t_{VPPH}		0	—	—	ns
Program Pulse Width	t_{PW}		45	50	55	ms
Program Pulse Time	t_{PRT}		5	—	—	ns
Program Pulse Time	t_{PFT}		5	—	—	ns

Note : V_{CC} must be applied simultaneously or before V_{PP} and removed simultaneously or after V_{PP}.

● SWITCHING CHARACTERISTICS

Test Conditions

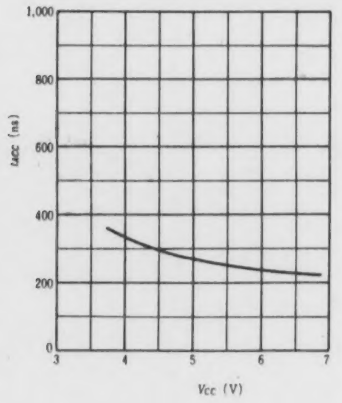
Input Pulse Level:	0.8V to 2.2V
Input Rise and Fall Times:	≤ 20 ns
Output Load:	1TTL Gate + 100pF
Reference Level for Measuring Timing:	Inputs; 1V and 2V, Outputs; 0.8V and 2V



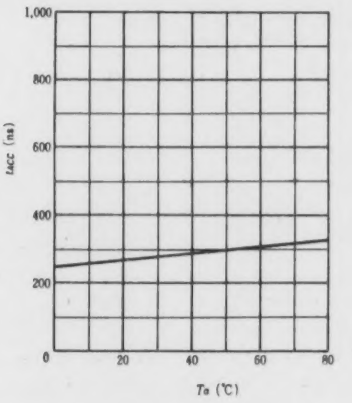
● ERASE

Erasure of HN462532 is performed by exposure to ultraviolet light with a wavelength of 2537Å, and all the output data are changed to "1" after this erasure procedure.
The minimum integrated close (i.e., UV intensity x exposure time) for erasure is 15W · sec/cm².

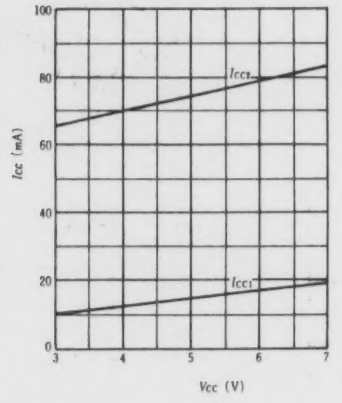
ACCESS TIME vs. SUPPLY VOLTAGE



ACCESS TIME vs. AMBIENT TEMPERATURE



SUPPLY CURRENT vs. SUPPLY VOLTAGE



SUPPLY CURRENT vs. AMBIENT TEMPERATURE